

Remarks

The specification has been amended to insert a period at the end of line 30 on page 4. Because this is the correction of an obvious typographical error, no new matter has been incorporated as a consequence of this amendment.

Claim 1 has been amended by: (1) incorporating the limitations of original claim 2 therein; and (2) replacing the term “water soluble peroxygen compound” with the term “persulfate”. Support for this amendment is found on page 6, lines 6 wherein dipersulfates and monopersulfates (i.e., the only chemical forms of persulfates) are listed as suitable “water soluble peroxygen compounds”.

Claim 2 has been amended by deleting the phrase “process water”. In addition, claims 4, 6, 8 and 15-17 have been amended to replace the term “peroxygen compound” with the term “persulfate” so that they have a proper antecedent basis with newly amended claim 1.

Finally, new claim 18 has been added. Support for this claim is found at page 20, line 4 of the specification. Consequently, no new matter has been inserted as a result of the present amendment of the claims.

In the outstanding Official Action, the Specification is objected to because of certain informalities; Claims 1-7, 9-12 and 14-17 stand provisionally rejected on the ground of non-statutory obviousness-type double patenting over claims 1-4, 14, 15 and 17-24 of copending Application No. 10/565,564; Claims 1-17 stand provisionally rejected on the ground of non-statutory obviousness-type double patenting over claims 16-22 and 27-30 of copending Application No. 10/518,249; Claims 1-5, 9-11 and 16 stand rejected under 35 USC 102(b) as being anticipated by Newton (U.S. Patent 5,700,107); Claims 1-3, 9, 10 and 12 stand rejected under 35 USC 102(b) as

being anticipated by Vineyard (U.S. Patent 6,576,144); Claims 1-3 and 9-12 stand rejected under 35 USC 102(b) as being anticipated by Watts et al (U.S. Patent 5,741,427); Claims 6-8 and 13-15 stand rejected under 35 USC 103(a) as being unpatentable over Newton (U.S. Patent 5,700,107); and Claim 17 stands rejected under 36 USC 103(a) as being unpatentable over Newton (U.S. Patent 5,700,107) in view of Hoag et al (U.S. Patent 6,019,548). These grounds of objection and rejection are respectfully traversed and reconsideration respectfully requested in light of the present amendments to the specification and claims, as well as of the arguments presented below, in which each of these bases for objection or rejection is discussed in turn.

The Objection to the Specification

The Specification is objected to because of the presence of a specified informality. In view of the present amendment of the Specification to correct such informality, it is urged that this objection should be withdrawn.

The Double Patenting Rejections

Preliminarily, Applicant's note that these rejections are provisional in that none of the rejected claims in the present application; nor any of the claims specified as the basis for such rejections in copending Applications Nos. 10/565,564 and 10/518,249 have been found to be allowable by the Patent and Trademark Office as of the date of this Amendment. Further, Applicants note that the determination of whether an obvious-type double patenting rejection exists ultimately depends upon the scope of the granted claims rather than upon pending claims which have not yet been allowed.

Nevertheless, Applicants hereby respectfully traverse these double patenting rejections. In this regard, it is noted that the emphasis of the present claimed invention is the use of persulfate and a chelated transition metal to oxidize organic compounds present in soil, groundwater, process water or wastewater. In contrast, the emphasis of copending Application No. 10/518,249 is the use of a water soluble peroxygen compound and a pH modifier; while the emphasis of copending Application No. 10/585,564 is the use of persulfate and hydrogen peroxide. Applicants submit that the required constituents of each of these combinations are patentably distinct such that these provisional double patenting rejections should be withdrawn.

The Rejection of Claims 1-5, 9-11 and 16 under 35 USC 102(b) as being anticipated
by Newton (U.S. Patent 5,700,107)

The present claimed invention, as amended, relates to a method of oxidizing an organic compound present in soil, groundwater, process water or wastewater comprising contacting such organic compound with a composition comprising persulfate and a chelated divalent or trivalent transition metal complex. As is demonstrated in the Examples included in the present specification, the use of a chelated metal complex unexpectedly improves the survivability of the catalyst as well as permitting the use of certain trivalent metal cations which are not otherwise effective catalysts for persulfate.

In contrast, Newton is directed to a method of treating contaminated material involving treatment with a chelating agent and a matrix generating agent. Newton does disclose that the matrix generating agent may optionally contain an oxidizing agent (including persulfate) (See column 4, lines 9-16); and that the matrix generating agent may contain compounds capable of initiating or maintaining free radical

reactions (including sulphates or chlorides of iron) (see Col 3, line 65 – Col. 4, line 8). However, applicants respectfully urge that Newton does not disclose or suggest reacting the chelating agent with the “free radical compound” in order to form a chelated complex as applicants have done.

In this regard, the Examiner’s attention is directed to Column 2, lines 45-47 of Newton. Newton explicitly states that “The chelating agent forms chelates with the inorganic pollutants and with the metal ions present in the soil.” Clearly, such chelating agents could not perform such a remedial function if they were already bound to the “free radical compound”.

Further, Newton requires that “Such free radical compounds become chemically embedded within the matrix” (See Col. 3, line 67 – Col. 4, line 1). It is apparent to one of skill in the art that such compounds could not become embedded in the matrix if they were chelated with chelating agents. Instead, such chelating agents would draw such compound out of the matrix.

Accordingly, it is urged that Newton does not disclose or suggest the use of a chelated metal catalyst in conjunction with persulfate. Rather, Newton discloses the optional use of a non-chelated catalyst in a silica matrix generating agent which is used in conjunction with a chelating agent – which chelating agent is intended to be used under conditions which will enable it to bind to metal ions “present in the soil”.

Therefore, it is respectfully urged that Newton does not either anticipate nor suggest the present claimed invention, and submitted that the rejection of claims 1-5, 9-11 and 16 in view of such publication should be withdrawn.

The Rejection of Claims 1-3, 9, 10 and 12 under 35 USC 102(e) as being
anticipated by Vineyard (U.S. Patent 6,576,144)

Vineyard discloses a method of continuously treating a wastewater stream in a plug flow reactor. Such treatment involves treatment with an oxidizer and a catalyst. Although such transition metal catalyst can be complexed with a complexing agent such as EDTA (see Col. 5, lines 29-52), it is noted that the use of persulfate as the oxidizer is nowhere suggested or disclosed. (See Col. 5, lines 17-27). Accordingly, because the claims of the present invention (as amended) require the use of a persulfate, it is urged that Vineyard does not anticipate or suggest the present claimed invention. Accordingly, it is respectfully urged that this ground of rejection should be withdrawn in light of the present amendment of the claims.

The Rejection of Claims 1-3 and 9-12 under 35 USC 102(b) as being
anticipated by Watts et al (US Patent 5,741,427)

Watts et al is directed to a method for removing contaminants from soil and/or groundwater employing an oxidizing agent and a “reaction product complex” produced from the reaction of a metal catalyst (which may be an iron chelate – See Col. 4, line 45) and a ligand donor which is an acid, the salt of an acid, or combinations thereof (see Col. 4, lines 63-65).

Preliminarily, it is noted that Watts et al does not disclose or suggest the use of persulfate as the oxidizing agent (see Col. 12, lines 12-29). Accordingly, Watts et al does not anticipate the present claimed invention (as amended) which requires the use of persulfate.

Further, the Examiner’s attention is directed to Col 1, line 64 – Col. 2, line 7 of the Watts publication. In this section, Watts et al indicates that the use of hydrogen peroxide and a metal catalyst (which Watts et al define as including chelates – see above) is ineffective to treat contaminated soil “because activity was confined to a

very limited area around the injection point". Accordingly, in order to overcome this deficiency, Watts et al disclose that the catalyst (even if itself chelated) needs to be complexed with the ligand donor as set forth above).

Applicant's urge that, in view of this teaching by Watts et al that the combination of hydrogen peroxide and a chelated catalyst is ineffective to effectively treat contaminated soil, the present claimed invention is completely unexpected. One of ordinary skill in the art would not predict that the use of persulfate in combination with a chelated catalyst would be effective in view of this disclosure.

In light of the above, it is urged that the rejection of the claims (as amended) in view of Watts et al should be withdrawn.

The Rejection of Claims 6-8 and 13-15 under 35 USC 103(a) as being unpatentable
over Newton (U.S. Patent 5,700,107)

The Examiner has rejected these claims on the basis that "Newton '107 discloses all the limitations of the claims except that the peroxygen compound is a sodium or potassium monopersulfate or a combination of di- and monopersulfate, and that preferred amounts of chelating agent and peroxide compounds are used." The Examiner then concludes that the disclosure of the use of persulfate would make the use of any persulfate compound obvious; and that optimization of the amounts of ingredients employed would be routine.

However, Applicants point out that, as is discussed in detail above, Newton does not suggest or disclose the use of a chelated catalyst, and thus such publication does not disclose all of the other claim limitations. Further, Applicants note the disclosure in Watts (also discussed in detail above) that a chelated catalyst when used

in conjunction with hydrogen peroxide will not efficiently remediate contaminated soil.

In view of Newton's failure to disclose or suggest the use of a chelated catalyst – coupled with the prior art's teaching that chelated catalysts (unless further reacted with a ligand donor compound) are ineffective when used with another oxidizing compound – it is urged that this publication does not render that present claims obvious.

The Rejection of Claim 17 under 35 USC 103(a) as being unpatentable over Newton
'107 in view of Hoag et al

Claim 17 stands rejected on the rationale that Newton discloses all the limitations of this claim except for the sequential addition of the components; and Hoag et al show a method for in situ soil remediation wherein permanganate and persulfate can be added to the soil either sequentially or together.

Preliminarily, Applicants note that permanganate and persulfate are both oxidizing compounds which will operate independently of one another. See Col. 3 lines 57-61 of Hoag et al wherein it is indicated that the peroxygen compound (persulfate) is introduced to satisfy the soil oxidant demand whereas the permanganate compound is introduced to oxidize VOCs present in the soil. Applicants submit that there is nothing unexpected that such independently effective compounds could be added together or sequentially without a significant effect on overall performance.

This is not the case with an oxidizing compound (e.g. persulfate) and a catalyst which directly impacts upon the functioning of such component. Applicants respectfully submit that a showing that two independently acting compounds could be

added sequentially would not suggest to one of ordinary skill in the art that two interdependent compounds could be added sequentially as well.

Applicants do note that Newton does in fact disclose the sequential addition of the matrix-generating agent and chelating agent disclosed therein (at Col. 4, lines 45-52). However, as is discussed above, Newton does not suggest the present claimed invention as it does not disclose the use of a chelated catalyst. While Hoag et al briefly note that transition metal ions (such as Fe^{++}) can be injected into the soil to add iron cations (see Col. 10, lines 43-46), this reference does not disclose or suggest the use of chelated catalysts and therefore does not remove this fundamental deficiency of the primary Newton reference.

In view of the failure of either of these cited references to suggest or disclose the use of a chelated catalyst, it is urged that this ground of rejection should be withdrawn.

Conclusion

The deficiency in the specification has been corrected such that the objection to the specification should be withdrawn. Further, the present claims, as amended, are neither anticipated nor rendered obvious by the cited references. Reconsideration of the rejection of such claims is respectfully requested, and allowance thereof courteously solicited.

Respectfully submitted,

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